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Hyung-sok Yeo

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EXAMINER

MALLARI, PATRICIA C

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3735

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/760,544	Applicant(s) YEO ET AL.	
	Examiner PATRICIA C. MALLARI	Art Unit 3735	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 16-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14, 16-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This is a non-final Office action. The indicated allowability of claim 15, now incorporated into claim 1, and of claim 16 regretfully has been withdrawn. See the rejection below for details.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4-12, 21-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 recites "a relative stress index" on line 7. Claim 4 depends from claim 1, which recites "a plurality of stress indexes" on line 7 of the claim. It is unclear whether the "relative stress index" in claim 4 is one of the "plurality of stress indexes" recited in claim 1, or is a different stress index

Claim 5 recites "a relative stress index". Claim 5 depends from claim 1, which recites "a plurality of stress indexes" on line 7 of the claim. It is unclear whether the "relative stress index" in claim 5 is one of the "plurality of stress indexes" recited in claim 1, or is a different stress index.

Claim 6 recites "a stress index" on line 10 of the claim. Claim 6 depends from claim 1, which recites "a plurality of stress indexes" on line 7 of the claim. It is unclear

whether the "stress index" in claim 6 is one of the "plurality of stress indexes" recited in claim 1, or is a different stress index.

Claim 7 recites "a relative stress index" on line 9. Claim 7 depends from claim 1, which recites "a plurality of stress indexes" on line 7 of the claim. It is unclear whether the "relative stress index" in claim 7 is one of the "plurality of stress indexes" recited in claim 1, or is a different stress index.

Claim 8 recites "a stress index" on line 10. Claim 8 depends from claim 1, which recites "a plurality of stress indexes" on line 7 of the claim. It is unclear whether the "stress index" in claim 8 is one of the "plurality of stress indexes" recited in claim 1, or is a different stress index.

Claim 11 recites "'a relative first stress index" and " a relative second stress index". Claim 11 depends from claim 1, which recites "a plurality of stress indexes" on line 7 of the claim. It is unclear whether these relative stress indexes of claim 11 are two of the "plurality of stress indexes" recited in claim 1, or are different stress indexes.

Claim 12 recites "a relative third stress index". Claim 12 depends from claim 1, which recites "a plurality of stress indexes" on line 7 of the claim. It is unclear whether the "relative third stress index" in claim 12 is one of the "plurality of stress indexes" recited in claim 1, or is a different stress index.

Claim 21 recites "a relative first stress index" on line 7 of the claim. Claim 21 depends from claim 17 which recites "a plurality of stress indexes" on line 10 of the claim. It is unclear if the "relative first stress index" recited in claim 21 is one of the "plurality of stress indexes" recited in claim 17 or is a different stress index.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 5,267,568 to Takara. Takara discloses a method of evaluating human stress using photoplethysmography (PPG) comprising defining at least one PPG parameter (pulse), radiating light having at least one wavelength, which reacts to a blood component to be measured, at a measuring target, and measuring a PPG signal from the measuring target during a predetermined period of time (See entire document, especially col. 5, lines 1-8; col. 8, lines 24-29; col. 9, lines 25-32 of Takara). A level of human stress is evaluated using a plurality of stress indexes (pulse frequency) obtained from the PPG parameter (see entire document, especially col. 5, lines 5-58; col. 8, lines 30-69; col. 9, line 32-col. 10, line 24; col. 11, lines 6-21 of Takara). The plurality of stress indexes and evaluated level of human stress obtained during evaluating the level of human stress are displayed (see entire document, especially fig. 3; col. 7, lines 41-51; col. 8, lines 9-23 of Takara).

Regarding claim 13, the plurality of stress indexes are averaged and an average stress index is determined as a final stress index (see entire document, especially col. 5, lines 9-32; col. 8, lines 36-69 of Takara).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takara, as applied to claims 1 and 13 above, and further in view of US Patent No. 4,907,596 to Schmid et al. Takara discloses detecting a pulse using a pulse counter, but is silent as to how the device recognizes a pulse. However, Schmid discloses a pulse beat detector that identifies a pulse by comparing a pulse component amplitude with a threshold value (see entire document, especially col. 2, lines 24-35 of Schmid). Therefore, it would have been obvious to one of ordinary skill in the art to use the technique of identifying a pulse of Schmid as that of the pulse counter of Takara, since Takara teaches a pulse counter that identifies and counts pulses, and Schmid describes an appropriate way for identifying such a pulse. In the resulting combination, the PPG parameter that is defined and from which a plurality of stress indexes is obtained is therefore the pulse amplitude component.

Regarding claim 3, evaluating the level of human stress comprises using a long-term test (see entire document, especially col. 5, lines 56-67 of Takara).

Regarding claim 16, Takara and Schmid both describe automated processes completed by circuitry and/or microprocessors, wherein such circuitry or microprocessor

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must inherently include a program or programs, stored on a medium, in order to enable the circuitry or microprocessor to carry out the method as claimed.

Claims 14, and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takara in view of Schmid, as applied to claims 1, 2, and 16, above, and further in view of US Patent No. 6,280,390 to Akselrod et al. Regarding claims 14, and 17-19, Takara, as modified, lacks low pass filtering the signal. However, Akselrod teaches a PPG signal measuring unit, wherein the acquired signal is low-pass filtered to remove high-frequency noise (see entire document, especially col. 11, lines 56-57 of Akselrod). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the filter of Akselrod with the apparatus of Takara in order to eliminate noise, thereby ensuring a more accurate result.

Regarding claim 17, the combined references disclose a PPG measuring unit 20 which radiates light having at least one wavelength, which reacts to a blood component to be measured, at a measuring target, and measuring a PPG signal from the measuring target during a predetermined period of time (See entire document, especially col. 5, lines 1-8; col. 8, lines 24-29; col. 9, lines 25-32 of Takara). An amplifying and filtering unit amplifies the PPG signal provided to the PPG measuring unit to a predetermined level and filters to remove noise components (see entire documents, especially fig. 4; col. 8, lines 30-69 of Takara; col. 11, lines 56-57 of Akselrod). A signal processing unit 29 defines at least one PPG parameter and evaluates a level of human stress using a plurality of stress indexes (pulse frequency)

obtained from the PPG parameter (see entire document, especially col. 5, lines 5-58; col. 8, lines 30-69; col. 9, line 32-col. 10, line 24; col. 11, lines 6-21 of Takara). A display unit is configured to display the plurality of stress indexes and evaluated level of human stress obtained by the processing unit (see entire document, especially fig. 3; col. 7, lines 41-51; col. 8, lines 9-23 of Takara).

With further regard to claim 18, in the resulting combination, the PPG parameter that is defined and from which a plurality of stress indexes is obtained is therefore the pulse amplitude component.

With further regard to claim 19, the level of human stress is acquired from at least a long-term test based on the measuring time of the PPG signal, wherein the measuring time is a day (see entire document, especially col. 5, lines 1-67 of Takara).

Claims 14, 17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takara, as applied to claims 1 and 13 above, and further in view of US Patent No. 6,280,390 to Akselrod et al. Regarding claims 14, 17, and 19, Takara, as modified, lacks low pass filtering the signal. However, Akselrod teaches a PPG signal measuring unit, wherein the acquired signal is low-pass filtered to remove high-frequency noise (see entire document, especially col. 11, lines 56-57 of Akselrod). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the filter of Akselrod with the apparatus of Takara in order to eliminate noise, thereby ensuring a more accurate result.

Regarding claim 17, the combined references disclose a PPG measuring unit 20 which radiates light having at least one wavelength, which reacts to a blood component to be measured, at a measuring target, and measuring a PPG signal from the measuring target during a predetermined period of time (See entire document, especially col. 5, lines 1-8; col. 8, lines 24-29; col. 9, lines 25-32 of Takara). An amplifying and filtering unit amplifies the PPG signal provided to the PPG measuring unit to a predetermined level and filters to remove noise components (see entire documents, especially fig. 4; col. 8, lines 30-69 of Takara; col. 11, lines 56-57 of Akselrod). A signal processing unit 29 defines at least one PPG parameter and evaluates a level of human stress using a plurality of stress indexes (pulse frequency) obtained from the PPG parameter (see entire document, especially col. 5, lines 5-58; col. 8, lines 30-69; col. 9, line 32-col. 10, line 24; col. 11, lines 6-21 of Takara). A display unit is configured to display the plurality of stress indexes and evaluated level of human stress obtained by the processing unit (see entire document, especially fig. 3; col. 7, lines 41-51; col. 8, lines 9-23 of Takara).

Regarding claim 19, the level of human stress is acquired from at least a long-term test based on the measuring time of the PPG signal, wherein the measuring time is a day (see entire document, especially col. 5, lines 1-67 of Takara).

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takara in view of Akselrod, as applied to claims 14, 17, and 19 above, and further in view of US Patent No. 5,413,101 to Sugiura. Takara, as modified, is silent as to the shape of the

PPG measuring unit. However, Sugiura discloses a PPG measuring unit having a "C" shape so that the measuring target can be inserted into the PPG measuring unit and has a transmissive or a reflective structure (see entire document, especially figs. 1-4 of Sugiura). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use the structure of the unit of Sugiura as that of Takara, since Takara teaches using a PPG measuring unit and Sugiura describes an appropriate structure for such a unit.

Response to Arguments

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

Claims 4-12, and 21-24 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 4, 11, 12, and 21-24, the primary reason for allowance is the inclusion of obtaining an average of pulse component amplitudes and an average peak-to-peak interval during the predetermined period of time, comparing a baseline spread range with the average of pulse component amplitudes during the predetermined period

of time, and calculating a relative first stress index based on a relationship between the baseline spread range and the average of pulse component amplitudes, in combination with all of the other limitations of the claims, which is not found in the prior art.

Regarding claim 5, the primary reason for allowance is the inclusion obtaining an average of peak-to-peak intervals during a predetermined period of time, counting a number of peak-to-peak intervals less than the average peak-to-peak interval and a number of intervals greater than the average during the predetermined period of time, and calculating a relative stress index based on a relationships between the number of peak-to-peak intervals less than the average and the number greater than the average, in combination with all of the other limitations of the claims, which is not found in the prior art.

Regarding claims 6 and 9 , the primary reason for allowance is the inclusion of defining a plurality of data groups composed of a predetermined number of peak-to-peak intervals obtained during the predetermined period of time, performing a statistical method according to a number of the plurality of data groups, and calculating a stress index based on a p-value detected as a result of performing the predetermined statistical method, in combination with all of the other limitations of the claims, which is not found in the prior art.

Regarding claim 7, the primary reason for allowance is the inclusion obtaining an average of pulse components during a predetermined period of time, counting a number of pulse components having an amplitude less than the average pulse component amplitude and a number of pulse components having an amplitude greater than the

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average pulse component amplitude, and calculating a relative stress index based on a relationships between the number of pulse components having an amplitude less than the average and the number having an amplitude greater than the average, in combination with all of the other limitations of the claims, which is not found in the prior art.

Regarding claims 8 and 10, the primary reason for allowance is the inclusion defining a plurality of data groups composed of a predetermined number of pulse component amplitudes with respect to all of the pulse component amplitudes obtained during the predetermined period of time, performing a statistical method according to a number of the plurality of data groups, and calculating a stress index based on a p-value detected as a result of performing the predetermined statistical method, in combination with all of the other limitations of the claims, which is not found in the prior art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PATRICIA C. MALLARI whose telephone number is (571)272-4729. The examiner can normally be reached on Monday-Friday 10:00 am-6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Marmor, II can be reached on (571) 272-4730. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Patricia C. Mallari/
Examiner, Art Unit 3735